



Exercise Stress Test

Version: 1
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Summary:

The exercise stress test is a maximal exercise test used to calculate VO₂ max, during which the mice run to complete exhaustion as the treadmill speed is increased every three minutes (See table 1). During the test, direct measurements of the oxygen consumption by the mouse are made, which are then used to calculate VO₂ max. VO₂ max, or maximal oxygen uptake, is a factor that determines the mice’s capacity to perform sustained exercise. VO₂ max refers to the maximum amount of oxygen that the mouse can utilize during intense or maximal exercise. It is measured as "milliliters of oxygen used in one minute per kilogram of body weight" (ml/kg/min).

Reagents and Materials:

Material	Vendor
Treadmill	Columbus Instruments
Oxymax	Columbus Instruments

Protocol:

1. Mice are familiarized with the treadmill on the day prior to the experiment by exercising them for 10 minutes at 10m/min.
2. On the day of the experiment, the mouse is placed in the stopped treadmill for 45 min to acclimatize and the Oxymax system is started.
3. After 45 min, basal measurements are made for 15 min in the stopped treadmill.
4. Treadmill is started at 10m/min.
5. After 3 min, speed is increased by 4m/min.
6. Every three minutes thereafter, speed is increased by 4m/min until mouse has reached exhaustion (table 1). Exhaustion is defined as sitting on the shock pad and not trying to get off. Shocks are set at 1.5mA, 200ms pulses, 4Hz.
7. Once exhaustion is reached, the mouse is left 30 min in the stopped treadmill to recover.

Table 1:

Time (minutes)	Speed (m/min)
0	10
3	14
6	18
9	22
12	26
15	30
18	34
21	38
24	42
27	46